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Transient nutations in magnetically diluted solids: An account of the spin flip-flop transitions

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Abstract

Transient nutations of the dipolar-coupled spins in solids are studied theoretically. The spins have either electronic (paramagnetic ions or defects in crystals) or nuclear origin and are subjected to the external resonant magnetic field that continually drives the total magnetization. For an ensemble of spins that have equal resonance frequencies, the flip-flop transitions are possible. The existing microscopic model of the magnetic relaxation in transient regime is modified in order to obtain the decay rate of the transient nutations in this particular case. © Springer Science+Business Media 2012.

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Keywords

Electron paramagnetic resonance, Magnetic dipolar interaction, Rabi oscillations, Transient nutations